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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,275	07/08/2003	Dirk Sonksen	21295-56	1274

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EXAMINER
YAM, STEPHEN K

ART UNIT	PAPER NUMBER
2878	

DATE MAILED: 07/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/604,275	SONKSEN ET AL.	
	Examiner	Art Unit	
	Stephen Yam	2878	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *08 July 2003* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *0703*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: 2, 3, 4, 5, 6, 8, 10 (mentioned in Paragraph 0044-0045 of the specification). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

2. Claim 16 is objected to because of the following informalities:

In Claim 16, line 3, "Yp" should be changed to "Y_p" for claim consistency,

In Claim 16, a period should be placed at the end of the claim.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1, 2, 4-6, 8, 15-17, and 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Yamamura et al. US Patent No. 5,780,866.

Regarding Claims 1 and 15, Yamamura et al. teach (see Fig. 1-5) a method and apparatus for scanning specimens (1) using an optical imaging system (6, 7, 8) and a scanning stage (2), comprising the steps of calibrating the scanning stage (and displacing using a control unit (3) (see Fig. 1)) by obtaining and storing height values Z at different calibration positions X, Y of the scanning stage (see Col. 18, lines 26-35), and thereby generating a height profile of the scanning stage and storing it in a memory (see Col. 16, lines 44-48 and Col. 18, lines 28-45), scanning specimens (see Fig. 7 and 11), and thereby determining a reference height Z_{ref} (extreme-limit setting for Z-stage) of the specimen at the beginning of a specimen scan, traveling to specimen points X_p, Y_p using the scanning stage (see Fig. 7 and 11), setting/determining using a computation unit (9, 10) (see Fig. 1 and Col. 19, lines 8-22), while traveling to specimen point X_p, Y_p, a specimen height position Z_p pertinent to the respective specimen point X_p, Y_p, the specimen height position Z_p being determined from the reference height Z_{ref} and the height profile of the scanning stage (see Col. 18, lines 28-45), and acquiring an image and/or performing a measurement at specimen point X_p, Y_p (see Col. 2, lines 51-58, Col. 15, lines 31-40, and Col. 16, lines 1-13 and 43-50).

Regarding Claim 2, Yamamura et al. teach images of the specimen acquired by means of a camera, and/or measurements on the specimen being made by means of an optical measurement device, at specimen points X_p, Y_p (see Col. 15, lines 61-62 and Col. 16, lines 34-50).

Regarding Claim 4, Yamamura et al. teach, upon calibration of the scanning stage, the height values Z are obtained by focusing with a focusing system (see Col. 18, lines 22-45).

Regarding Claim 5, Yamamura et al. teach, during the specimen scan, the image is acquired and/or the measurement is made without stopping the scanning stage at the specimen point X_p, Y_p (see Col. 2, lines 47-48 and Col. 22, lines 4-12).

Regarding Claim 6 (dependent from Claims 1, 2, 4, and 5), Yamamura et al. teach, with specimen points X_p, Y_p arranged line-by-line, the specimen points X_p, Y_p are scanned in meander fashion (see Fig. 7 and 11).

Regarding Claim 8, Yamamura et al. teach the specimen height positions Z_p at the specimen points X_p, Y_p are determined, by interpolation or mathematical approximation functions, from the height profile of the scanning stage (see Col. 18, line 47 to Col. 19, line 8).

Regarding Claim 16, Yamamura et al. teach the optical device is a camera for acquiring images at each specimen point X_p, Y_p (see Col. 15, lines 61-62 and Col. 16, lines 34-50).

Regarding Claim 17, Yamamura et al. teach the optical device is an optical measurement device for performing a measurement at specimen points X_p, Y_p (see Col. 16, lines 34-50).

Regarding Claim 21, Yamamura et al. teach the measurement device is an optical spectrometer, an ellipsometer, or a layer thickness measurement system (see Col. 1, lines 27-35, Col. 2, lines 52-54 and Col. 16, lines 34-40).

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-3, 6, 7, 9-16, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wang et al. US Patent No. 5,804,813 in view of Fujimoto US Patent No. 6,245,585.

Regarding Claims 1-3, 6 (as dependent from Claim 3), 7, 9, 11, 13-16, 18, and 19, Wang et al. teach a method and apparatus for scanning specimens (see Col. 2, lines 64-66) using an optical imaging system (5, 9, 10) and a scanning stage (6, 8), comprising the steps of calibrating (with a control unit (14)) the scanning stage by obtaining and storing a height value Z at a calibration position X, Y of the scanning stage (see Col. 3, lines 49-66), scanning specimens (see Col. 3, lines 15-17), and thereby determining a reference height Z_{ref} (see Col. 3, lines 49-66) of the specimen at the beginning of a specimen scan, traveling to specimen points X_p, Y_p using the scanning stage (see Col. 3, lines 15-17), setting (see Col. 3, lines 7-14), a specimen height position Z_p pertinent to the respective specimen point X_p, Y_p, the specimen height position Z_p being determined using a computation unit (14) (see Col. 3, lines 49-66) from the reference height Z_{ref} of the scanning stage (see Col. 3, lines 7-14), and acquiring an image and/or performing a measurement at specimen point X_p, Y_p (see Col. 3, lines 33-48). Regarding Claims 2 and 16, Wang et al. teach images of the specimen acquired by means of a camera, and/or

measurements on the specimen being made by means of an optical measurement device, at specimen points X_p, Y_p (see Col. 3, lines 35-38). Regarding Claims 3 and 18, Wang et al. teach the reference height Z_{ref} of the specimen is identified at the beginning of the specimen scan (see Col. 3, lines 49-51) by focusing (height determination- see Col. 3, line 64 to Col. 4, line 3) with a focusing system (height adjustment between the sample and optical system- see Col. 3, lines 51-54) at a reference location X_{ref}, Y_{ref} (the testing location for the calibration- see Col. 3, lines 49-66) of the specimen. Regarding Claims 11 and 19, Wang et al. teach the optical imaging system as a microscope (see Col. 1, lines 63-65). Regarding Claim 14, Wang et al. teach an image field of the camera and the spacings of the specimen points X_p, Y_p are selected in such that an image of the entire specimen results when the images of all the specimen points X, Y are juxtaposed ("sectioning"- see Col. 1, lines 38-42 and Col. 3, lines 45-48). Regarding Claims 1 and 15, Wang et al. do not teach storing height values at *different* calibration positions X, Y of the scanning stage in a memory and thereby generating a height profile of the scanning stage, with setting a specimen height position Z_p *while traveling to specimen point* X_p, Y_p, with Z_p determined from the reference height Z_{ref} *and the height profile*. Regarding Claim 6, Wang et al. do not teach, with specimen points X_p, Y_p arranged line-by-line, the specimen points X_p, Y_p are scanned in meander fashion. Regarding Claims 7 and 9, Wang et al. do not teach the height values Z identified at the calibration positions X, Y stored in a lookup table or if the calibration positions X, Y and specimen points X_p, Y_p are coincident, the specimen height position Z_p is determined from the corresponding height value Z from the lookup table and the reference height Z_{ref}. Regarding Claim 13, Wang et al. do not teach the focusing system as an LED or laser autofocus system. Fujimoto teaches (see Fig. 1, 3, and 4A) a focusing component for an optical

system with a step of calibrating a scanning stage by obtaining and storing height values Z at different calibration positions X, Y of the scanning stage (see Fig. 3 (201-203) and Col. 1, line 48 to Col. 2, line 2) and thereby generating a height profile of the scanning stage (see Fig. 4B and Col. 5, lines 37-39) stored in a memory (see Col. 5, lines 27-38), determining a reference height Z_{ref} (baseline for "offset"- see Col. 4, lines 49-51 and Col. 5, lines 30-38) of the specimen, and setting, while traveling to specimen point X_p, Y_p, a specimen height Z_p pertinent of the respective specimen point X_p, Y_p, the specimen height position being determined from the reference height Z_{ref} and the height profile of the scanning stage (see Fig. 3 (208-210) and Col. 5, line 66 to Col. 6, line 6), with specimen points X_p, Y_p arranged line-by-line, the specimen points X_p, Y_p are scanned in meander fashion (see Fig. 4A), with the height values Z identified at the calibration positions X, Y stored in a lookup table (since a memory storing data values for multiple positions is a lookup table) and if the calibration positions X, Y and specimen points X_p, Y_p are coincident (each "cell"), the specimen height position Z_p is determined (see Col. 6, lines 1-6) from the corresponding height value Z from the lookup table and the reference height Z_{ref} (see Col. 4, lines 49-51), with a focusing system as an LED or laser autofocus system (see Col. 4, lines 40-51 and Col. 5, lines 3-8). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the focusing process (with *different* calibration positions and generate a height profile of the scanning stage to store in a memory and set a specimen height position Z_p for X_p, Y_p while traveling to specimen point X_p, Y_p, with Z_p determined from the reference height Z_{ref} *and the height profile*, with specimen points X_p, Y_p arranged line-by-line, the specimen points X_p, Y_p are scanned in meander fashion with the height values Z identified at the calibration positions X, Y stored in a lookup table and if the calibration

positions X, Y and specimen points X_p, Y_p are coincident, the specimen height position Z_p is determined from the corresponding height value Z from the lookup table and the reference height Z_{ref}, with a focusing system as an LED or laser autofocus system, as taught by Fujimoto, in the method and apparatus of Wang et al., to provide continuous focus for a clear image for all scanning points.

Regarding Claim 10, Wang et al. in view of Fujimoto teach the method in Claim 1, according to the appropriate paragraph above. Wang et al. do not teach, for calibration of the scanning stage, a flat substrate is placed onto the scanning stage. Fujimoto teaches, for calibration of the scanning stage (and also for scanning of the specimen), a flat substrate (110) is placed onto the scanning stage (see Fig. 1). It would have been obvious to one of ordinary skill in the art at the time the invention was made, for calibration of the scanning stage, to provide a flat substrate placed onto the scanning stage, as taught by Fujimoto in the method of Wang et al. in view of Fujimoto, to provide additional support for the specimen and provide protection for the scanning stage.

Regarding Claims 12 and 20, Wang et al. in view of Fujimoto teach the method and apparatus in Claims 1 and 15, according to the appropriate paragraph above. Wang et al. do not teach the optical imaging system as a macroscope. It is well known in the art to apply optical detection systems towards imaging any form or size of specimens, depending on the desired application. It would have been obvious to one of ordinary skill in the art at the time the invention was made to provide the optical imaging system as a macroscope in the method and apparatus of Wang et al. in view of Fujimoto, to enable imaging of larger objects.

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Miller US Patent No. 6,674,058, teaches an apparatus for scanning specimens using an optical imaging system with calibrating the scanning stage by obtaining and storing height values at different calibration positions and generating a height profile of the scanning stage.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stephen Yam whose telephone number is (571)272-2449. The examiner can normally be reached on Monday-Friday 8:30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Porta can be reached on (571)272-2444. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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THANH X. LUU
PATENT EXAMINER